

WHAT IS CLAIMED IS:

1. A communication system comprising:
a plurality of frequency division uplinks, each uplink comprising an information channel;
a space segment receiving the uplinks, restoring data from the information channels in the uplinks to baseband data, and combining data from selected information channels into at least one time division multiplex signal;
at least one time division multiplex downlink comprising a time division multiplex signal; and
a broadcast station for transmitting a source signal divided among selected ones of the plurality of frequency division uplinks, each of the selected uplinks comprising information designating the selected uplinks as related.
2. The communication system of claim 1 including a plurality of uniform-rate uplinks.
3. The communication system of claim 1 wherein the uplinks each comprise at least one uniform rate channel and an audio source program is divided among a plurality of uniform rate channels.
4. The communication system of claim 3 wherein the audio source program is characterized by one of a plurality of qualities of service for broadcasting the audio signal comprising amplitude modulated monaural signal quality, frequency modulated monaural signal quality, frequency modulated stereo signal quality, and optical disc stereo signal quality.
5. The communication system of claim 1 further including a radio receiving a time division multiplexed downlink and generating an output from a selectable plurality of uniform rate information channels.

6. The communication system of claim 1 wherein the broadcast station transmits an audio signal as a plurality of related frequency division uplinks, each uplink including information designating the uplinks as related.

7. The communication system of claim 1 wherein the broadcast station transmits scrambled audio signals as a plurality of related frequency division uplinks, each uplink including information designating the uplinks as related.

8. The system of claim 1 further including a satellite control station that commands the space segment to reconfigure routing of selected uplink information channels into the downlink.

9. The system of claim 1 further including a satellite control station that commands the space segment to reconfigure routing of selected uplink information channels into a plurality of downlinks.

10. The communication system of claim 1 further comprising a plurality of time division multiplex downlinks.

11. The communication system of claim 10 further comprising a satellite control station that commands the space segment to route selected uplink information channels into selected ones of the plurality of time division multiplex downlinks.

12. The communication system of claim 1 wherein the information channel comprises data selected from the group consisting of paging signals, video, graphic images, database data, file transfer data, maps and text.

13. A radio receiver for use in a communication system, said communication system including a plurality of frequency division uplinks and a time division multiplex

downlink, said downlink including information from related uplinks, said radio receiver comprising:

- a demodulator;
- a demultiplexer; and
- a decoder that generates a composite output signal from information from a related ensemble of uplinks.

14. The receiver of claim 13 for use in a communication system, said system including a plurality of scrambled frequency division uplinks, said receiver further including a selectable control device that descrambles a scrambled uplink in response to an authorizing signal.

15. A communication system for the broadcast and reception of programs comprising:

a plurality of frequency division multiplex uplinks, each uplink including at least one information channel, the programs consisting of a variable number of uniform rate channels that are each characterized by a minimum signal rate, the information channel in each uplink comprising at least one uniform rate channel corresponding to a respective one of the programs, each uniform rate channel having a corresponding control word, the system being programmable to combine uniform rate channels corresponding to at least one program and located in different information channels into a digital signal group having a higher signal rate than the minimum signal rate and to provide the control word in each uniform rate channel in the digital signal group with at least one bit to indicate that the uniform rate channel belongs to the digital signal group;

a space segment receiving the uplinks, restoring data from the information channels to baseband data, and combining the baseband data from selected information channels into at least one time division multiplexed signal; and

at least one time division multiplex downlink including the time division multiplexed signal.

16. A method of broadcasting a program to at least one receiver via a space segment comprising the steps of:

formatting a program into a plurality of uniform rate channels, each uniform rate channel having a corresponding control word indicating that the uniform rate channel is related to another uniform rate channel;

modulating the uniform rate channels onto different ones of a plurality of frequency division uplinks;

processing the uplinks via the space segment to recover the uniform rate channels as baseband data; and

routing the baseband data into selected time slots in at least one time division multiplex downlink signal.

17. The method of claim 16 wherein the routing step comprises the step of routing the baseband data into selected time slots in selected ones of a plurality of time division multiplex downlink signals.

18. The method of claim 17 further comprising the step of generating control signals to dynamically control routing of baseband data into one of the downlink signals by the space segment.

19. The method of claim 16 wherein the formatting step comprises the step of combining an audio program with ancillary data selected from the group consisting of paging signals, video, graphic images, database data, file transfer data, maps and text into a number of related uniform rate channels.

20. A method of formatting programs for broadcast to at least one receiver via a space segment comprising the steps of:

dividing each of the programs into a number of uniform rate channels, each uniform rate channel being characterized by a minimum signal rate;

providing each uniform rate channel with a control word;

combining the uniform rate channels corresponding to at least one program into a digital signal group having a higher signal rate than the minimum signal rate; and

providing the control word in each uniform rate channel in the digital signal group with at least one bit to indicate that the uniform rate channel belongs to the digital signal group.

21. A method as claimed in claim 20, further comprising the step of providing data in each control word, the data being selected from the group consisting of bits representing a number of related digital signal groups, bits uniquely identifying the digital signal group to which a uniform rate channel associated with the control word belongs, bits representing the number of the uniform rate channels in the corresponding digital signal group, bits uniquely identifying the uniform rate channel corresponding to the control word, bits representing a number of sub-ensembles constituting at least one digital signal group, bits representing the number of uniform rate channels in a sub-ensemble, and bits uniquely identifying a sub-ensemble.

22. A method as claimed in claim 20, further comprising the step of providing data in each control word to indicate which of audio, video and data constitute the corresponding uniform rate channel.

23. A method as claimed in claim 20, further comprising the step of providing blocking bits in the control word of selected uniform rate channels to prevent reception of at least a portion of the selected uniform rate channels by the receiver.

24. A broadcast communication system comprising:
a plurality of frequency division multiplexed uplinks, each of said uplinks comprising an information channel;

a space segment for receiving said uplinks, restoring data from said information channels to baseband data, and combining said data from selected ones of said information channels into at least one time division multiplexed signal; and

at least one time division multiplexed downlink comprising a time division multiplexed signal;

wherein each of said uplinks has a uniform rate, said uplinks corresponding to uniform-rate uplink channels, and a source program to be broadcast via said broadcast communication system is divided among a plurality of said uniform-rate uplink channels.

25. A broadcast communication system as claimed in claim 24, wherein each of said uplinks is provided with a control word indicating that said information channel in each of said uplinks is related to at least another said information channel.

26. A broadcast communication system comprising:

a plurality of frequency division multiplexed uplinks, each of said uplinks comprising an information channel;

a space segment for receiving said uplinks, restoring data from said information channels to baseband data, and combining said data from selected ones of said information channels into at least one time division multiplexed signal;

at least one time division multiplexed downlink comprising a time division multiplexed signal; and

a broadcast station configured to process a program signal for broadcast via said space segment by scrambling said program signal, dividing said program signal among a plurality of selected ones of said uplinks, and providing control data in each of said selected ones of said uplinks to indicate that said selected ones of said uplinks are related.

27. A broadcast communication system comprising:

a plurality of frequency division multiplexed uplinks, each of said uplinks comprising an information channel;

a space segment for receiving said uplinks, restoring data from said information channels to baseband data, and combining said data from selected ones of said information channels into at least one time division multiplexed signal;

at least one time division multiplexed downlink comprising a time division multiplexed signal; and

a radio for receiving said downlink;

wherein the information channel of a number of said uplinks is provided in said time division multiplexed signal via said space segment, said radio being configured to generate an output from said information channel of selected ones of said uplinks provided in said downlink.

28. A broadcast communication system as claimed in claim 27, further comprising a satellite control station configured to command said space segment to route said information channel of selected ones of said uplinks into said downlink.

29. A broadcast communication system as claimed in claim 27, further comprising a second downlink, said satellite control station configured to command said space segment to route said information channel of selected ones of said uplinks into one of said downlink and said second downlink.